CLAIMS

[1] A refrigerating storage cabinet in which an inner atmosphere is refrigerated by a refrigeration unit including a compressor and an evaporator, characterized in that the compressor is a variable performance type, and by:

storing means for storing data of a cooling characteristic indicative of a time-varying mode of reduction in a target physical amount associated with cooling, such as an internal temperature; and

operation control means for varying a performance of the compressor on the basis of an output of a physical amount sensor detecting the physical amount so that the physical amount is reduced following the cooling characteristic read from the storage means.

[2] The refrigerating storage cabinet of claim 1, characterized in that the inner atmosphere is adapted to be refrigerated to a predetermined set temperature, and the cooling characteristic is a pull down cooling characteristic associated with a pull down cooling zone, which is a temperature zone from a high temperature, apart from the set temperature, to near the set temperature.

[3] The refrigerating storage cabinet of claim 1, characterized in that control-cooling is adapted to be performed such that the compressor is operated when the

internal temperature has reached an upper limit temperature, higher by a predetermined value than the set temperature, and the compressor is stopped when the internal temperature has reached a lower limit temperature, lower by a predetermined value than the set temperature, the compressor being repeatedly operated and stopped so that the inner atmosphere is maintained about the set temperature, whereby control-cooling is performed, and the cooling characteristic is a control-cooling characteristic associated with the control-cooling zone.

[4] The refrigerating storage cabinet according to any one of claims 1 to 3, characterized in that the compressor is a speed-controllable inverter compressor, and the operation control means comprises:

a physical amount change computing section computing a degree of reduction of the physical amount on the basis of a signal of the physical amount sensor at every predetermined sampling time;

a target physical amount reduction degree output section providing a target physical amount reduction degree for a physical amount at the sampling time on the basis of the cooling characteristic, stored in the storage means, at every sampling time;

a comparing section for comparing an actual physical amount reduction degree computed by the physical amount change computing section with the target physical amount reduction

degree provided by the target physical amount reduction degree output section; and

a speed control section controlling the inverter compressor so that a speed of the inverter compressor is increased when the actual physical amount reduction degree is smaller than the target physical amount reduction degree and so that the speed of the inverter compressor is decreased when the actual physical amount reduction degree is larger than the target physical amount reduction degree, based on the results of a comparison by the comparing section.

[5] The refrigerating storage cabinet according to claim 4, characterized in that the refrigerating characteristic is represented as a linear function involving a physical amount and time, and the target physical amount reduction degree output section provides the target physical amount reduction degree as a constant value.

[6] The refrigerating storage cabinet of claim 4, characterized in that the refrigerating characteristic is represented as a quadratic function involving a physical amount and time, and the physical amount reduction degree output section computes a physical amount reduction degree in the physical amount at every sampling time, providing a computed value based on the quadratic function as the target physical amount reduction degree.

[7] The refrigerating storage cabinet of claim 4, characterized in that the refrigerating characteristic is represented as an exponential function involving a physical amount and time, and the physical amount reduction degree output section computes a physical amount reduction degree in the physical amount at every sampling time, providing a computed value based on the exponential function as the target physical amount reduction degree.

[8] The refrigerating storage cabinet of claim 4, further characterized by a reference table previously made so as to put a physical amount and the target physical amount reduction degree into a correspondence with each other on the basis of the cooling characteristic and in that the target physical amount reduction degree output section has a function of retrieving and providing the target physical amount reduction degree corresponding to a current physical amount in the reference table.

[9] The refrigerating storage cabinet of claim 4, characterized in that the inner atmosphere is adapted to be refrigerated to a predetermined set temperature, and the cooling characteristic is a pull down cooling characteristic associated with a pull down cooling zone, which is a temperature zone from a high temperature, apart from the set temperature, to near the set temperature, wherein on a first half side of the pull down cooling zone, the pull down cooling

characteristic is represented as a linear function involving a physical amount and time, and the target physical amount reduction degree output section provides the target physical amount reduction degree as a constant value, wherein on a second half side of the pull down cooling zone, the pull down cooling characteristic is represented as a quadratic function involving a physical amount and time, and the target physical amount reduction degree output section computes a physical amount reduction degree in the physical amount at every sampling time, providing a computed value based on the quadratic function as the target physical amount reduction degree, or wherein a reference table is previously made so as to place a physical amount and the target physical amount reduction degree into correspondence with each other on the basis of the cooling characteristic and in that the target physical amount reduction degree output section has a function of retrieving and providing the target physical amount reduction degree corresponding to a current physical amount in the reference table.

[10] The refrigerating storage cabinet of claim 4, further characterized by a plurality of programs which vary performance of the compressor so that a physical amount associated with cooling, such as an internal temperature, is reduced following a predetermined cooling characteristic, the programs having different cooling characteristics, wherein each program is selectively stored in control means provided

in the refrigeration unit so as to be executable.

[11] The refrigerating storage cabinet of claim 2, characterized in that a plurality of target pull down cooling characteristics is provided, and each pull down cooling characteristic is selectively readable according to a condition or the like.

[12] The refrigerating storage cabinet of claim 11, characterized in that one of the pull down cooling characteristics is selectable according to a zone of a physical amount associated with cooling, such as an internal temperature.

[13] The refrigerating storage cabinet of claim 11, characterized in that each pull down characteristic is indicative of a time-varying mode of reduction in a temperature, and the condition is a difference between the set temperature and an actual internal temperature, wherein the pull down cooling characteristic with a relatively smaller temperature drop degree is selected when the difference is not more than a predetermined value, and the pull down cooling characteristic with a relatively larger temperature drop degree is selected when the difference is above the predetermined value.

[14] The refrigerating storage cabinet of claim 13,

characterized in that one of the pull down cooling characteristics is an auxiliary cooling characteristic with a temperature curve in which a convergence temperature remains at a temperature higher by a predetermined value than the set internal temperature, wherein the auxiliary cooling characteristic is selected when a difference between the internal temperature and an evaporation temperature of the evaporator is at or above a predetermined value or when the internal temperature is apart from a target temperature by a predetermined value or above.

[15] The refrigerating storage cabinet of claim 1, characterized in that:

pull down cooling is performed in which an inner atmosphere is cooled from a high temperature, apart from the set temperature, to near a set temperature, and control-cooling is performed in which the compressor is operated when the internal temperature has reached an upper limit temperature, higher by a predetermined value than the set temperature, and the compressor is stopped when the internal temperature has reached a lower limit temperature, lower by a predetermined value than the set temperature, the compressor being repeatedly operated and stopped so that the inner atmosphere is maintained about the set temperature;

regarding a pull down cooling zone, the storing means stores data of a pull down cooling characteristic indicative of a time-varying mode of reduction in a target physical amount

associated with cooling, such as an internal temperature, and the performance of the compressor is varied on the basis of the output of a temperature sensor detecting the internal temperature so that the internal temperature is reduced following the cooling characteristic read from the storing means; and

regarding a control-cooling zone, the performance of the compressor is varied so that the internal temperature is reduced from the upper limit temperature to the set temperature following the pull down cooling characteristic read from the storing means, and operation control means is provided for decreasing the performance of the compressor after the internal temperature has reached the set temperature.

[16] The refrigerating storage cabinet of claim 1, characterized in that the operation control means has a function of increasing the performance of the compressor when the internal temperature has reached the set temperature and rises again after a reduction in the performance of the compressor.